WHAT IS CLAIMED IS:

1. An optical transmission system, comprising:

an optical source for generating an optical signal;

an RF signal source for generating an RF signal at a predetermined frequency, the RF signal source having an impedance;

a resonant optical phase modulator for modulating the phase of the optical signal according to the RF signal;

an optical amplifier for amplifying the optical signal to a power greater than 6 dBm;

an optical fiber line for transmitting the amplified and phase modulated optical signal;

wherein the resonant optical phase modulator includes:

an electro-optical substrate;

an optical waveguide formed in the substrate and having a variable index of refraction;

an active modulator electrode formed on the substrate in relation to the waveguide to effect electro-optical variation of the index of refraction upon application to the electrode of a modulating signal;

an interface port formed on the substrate and providing the RF modulating signal to the electrode;

an electrical structure, formed on the substrate and coupled to the interface port and the electrode, an impedance of the optical modulator including the interface port and the electrical structure being substantially equal to the impedance of the RF signal source.

2. A resonant optical modulator, comprising:

an electro-optical substrate;

an optical waveguide formed in the substrate and having a variable index of refraction;

an active modulator electrode formed on the substrate in relation to the waveguide to effect electro-optical variation of the index of refraction upon application to the electrode of a modulating signal at a frequency around a resonant frequency;

an interface port formed on the substrate and providing the modulating signal to the electrode from a signal source, the signal source having an impedance;

an electrical structure, formed on the substrate and coupled to the interface port and the electrode, an impedance of the optical modulator including the interface port and the electrical structure being substantially equal to the impedance of the signal source.

3. A resonant optical modulator as recited in claim 2, wherein the active modulator electrode is connected to ground.

4. A resonant optical modulator as recited in claim 2, wherein the electrical structure includes a delay line connected between the interface port and the electrode.

5. A resonant optical modulator as recited in claim 4, wherein the electrical structure includes a resonant stub connected at a first end to the interface port.

6. A resonant optical modulator as recited in claim 4, wherein the delay line has a length greater than $\lambda/40$, where λ is the wavelength in the delay line of a RF signal at the resonant frequency.

7. A resonant optical modulator as recited in claim 2, wherein the resonant frequency is in the range of 0.5 to 5 GHz.

8. A resonant optical modulator as recited in claim 7, wherein the resonant frequency is in the range of 1 to 4 GHz.

9. A resonant optical modulator, comprising:

an electro-optical substrate;

an optical waveguide formed in the substrate and having a variable index of refraction;

an active modulator electrode having a termination to ground and formed on the substrate in relation to the waveguide to effect electro-optical variation of the index of refraction upon application to the electrode of a modulating signal at a resonant frequency;

an interface port formed on the substrate for providing the modulating signal to the electrode from a signal source;

a first electrical element formed on the substrate and connected between the interface port and the electrode; and

a second electrical element formed on the substrate and connected between the interface port and ground.

10. A resonant optical modulator as in claim 9, wherein a total impedance of the electrode, the interface port, the first electrical element, and the second electrical element substantially equals an impedance of the signal source.

11. A resonant optical modulator, comprising:

means for modulating an optical signal in an electro-optical substrate, said means for modulating being formed on the substrate;

means for providing an electrical modulating signal at a resonant frequency from a signal generating means, said means for providing being formed on the substrate; and

means, coupled to the means for providing and the means for modulating, for causing an impedance of the optical modulator to be substantially equal to the impedance of the signal generating means, said means for causing being formed on the substrate.

12. A resonant optical modulator as recited in claim 11, wherein the means for modulating is connected to ground.

13. A resonant optical modulator as recited in claim 11, wherein the means for causing includes a means for delaying the modulating signal connected between the means for providing and the means for modulating.

14. A resonant optical modulator as recited in claim 13, wherein the means for causing includes a shunt means connected between the means for providing and ground.

15. A resonant optical modulator as recited in claim 13, wherein the means for providing decreases in width from the signal generating means to its connection with the means for delaying.

16. An electrode structure for an optical modulator disposed on an electro-optical substrate having an optical waveguide extending therethrough, comprising:

a first electrode symmetrically disposed between first and second portions of a ground plane, and having a width decreasing from an edge of the substrate to a node;

a second electrode extending in one direction from the node and connecting to the first portion of the ground plane;

a third electrode extending in another direction from the node and having an end near the optical waveguide; and

a fourth electrode connected to the end of the third electrode near the optical waveguide, extending parallel to the optical waveguide, and connecting to the second portion of the ground plane.

17. An electrode structure as recited in claim 16, wherein an impedance of the electrode structure, viewed from an input to the first electrode, is substantially equal to an impedance of a signal source connected to the input of the first electrode.

18. An electrode structure as recited in claim 17, wherein a total impedance of the second, third, and fourth electrodes, viewed from the node, is substantially equal to the impedance of the signal source connected to the input of the first electrode.

19. An electrode structure as recited in claim 16, wherein the third electrode includes at least two orthogonal portions.

20. An electrode structure as recited in claim 16, wherein a modulating signal in the fourth electrode modulates an optical signal traveling through the optical waveguide.